[002] This application claims priority from German Application Serial No. 102 55 392.0 filed November 28, 2002.

[003] FIELD OF THE INVENTION

[004] The invention concerns an auxiliary transmission ~~of the type defined in more detail in the preamble of claim 1~~.

[005] BACKGROUND OF THE INVENTION

[012] SUMMARY OF THE INVENTION

[017] BRIEF DESCRIPTION OF THE DRAWINGS

[018] ~~Further advantages and advantageous design features of an auxiliary transmission according to the invention emerge from the description, the drawing and the claims. The drawing shows:~~ The invention will now be described, by way of example, with reference to the accompanying drawings in which:

[021] DETAILED DESCRIPTION OF THE INVENTION

[023] A drive torque delivered by a drive motor (not shown) is led into the auxiliary transmission 31 via a drive input shaft 4 and transferred via a first drive output shaft 5 and a second drive output shaft 6 to two drive shafts (not shown) of the vehicle, the second drive output shaft 6 being driven by the drive input shaft 4 via a chain 7. The connection between the drive input shaft 4 and the second drive output shaft 6 can be controlled by virtue of the clutch 2 formed as

a disk clutch in such manner that the connection is formed when the clutch 2 is engaged or closed, and interrupted when the clutch 2 is open. The all-wheel drive is therefore engaged or disengaged by means of the clutch [[12]] 2 which, in combination with the chain 7, constitutes a so-termed distributor unit for the optional distribution of a drive output torque to the first drive output shaft 5 or to both drive output shafts 5, 6 of the auxiliary transmission 31.

[025] The shaft 33 is displaced by a spherical-thread drive in the axial direction of the auxiliary transmission 31, whereby the sliding bush 32 can be moved between two engagement positions. In a first engagement position of the sliding bush 32 an annular gear wheel 9 of the planetary gear wheel assembly 3 is connected to a web 10 of the planetary gear wheel assembly. In the second engagement position of the sliding bush 32, the annular gear wheel 9 is connected fast to a transmission housing of the auxiliary transmission [[1]] 31 not shown in detail. The off-road gear of the auxiliary transmission 31 is engaged when the annular gear wheel 9 is connected fast to the transmission housing of the auxiliary transmission 31 by virtue of claw teeth of the sliding bush 32. When the annular gear wheel 9 is connected rotationally fast to the web or planetary gear support 10 of the planetary gear wheel assembly 3 by the claw teeth of the sliding bush 32, the off-road gear of the auxiliary transmission [[1]] 31 is deactivated.

[027] At the end of the auxiliary transmission [[1]] 31 facing away from the planetary gear wheel assembly 3 a hydraulic pump 14 is arranged directly on the drive input shaft 4, which is provided in order to supply the auxiliary transmission [[1]] 31 with oil and which is driven at the speed of the drive input shaft off-road gear is engaged the delivery performance of the hydraulic

pump 14 remains constant, since the drive input speed to the hydraulic pump 14 remains constant notwithstanding the change in transmission ratio when the of-road gear is engaged.

[032] The electric motor 8 is arranged in the coupling zone 18 with the coupling zone being defined by a first end face 40 of the auxiliary transmission and a corresponding end face 42 of the main transmission unit housing 19. The electric motor 8 is arranged between the auxiliary transmission 31 and the main transmission unit 17 in such a manner that [[it]] the electric motor 8 projects beyond an area of the main transmission unit 17 facing towards the auxiliary transmission 31 and is positioned outside a housing 19 of the main transmission unit. This allows the housing 19 of the main transmission unit 17 to be designed independently of the electric motor 8 and simplifies the assembly of the range-change transmission 1 as a whole.

[033] Obviously, as an alternative to this it is a matter for the judgement of a person with knowledge of the field to attach the electric motor by appropriate means either to the housing 35 of the auxiliary transmission or to that of the main transmission unit or to both at the same time. In addition it can also be provided that a damper element [[33]] is arranged between the electric motor and the housing of the auxiliary transmission and between the electric motor and the housing of the main transmission unit, respectively, to ensure or achieve vibration decoupling between the auxiliary transmission, the main transmission unit and the electric motor and to avoid juddering impact between these structural groups during operation.

[038] To be able to reduce the distance between the auxiliary transmission [[1]] 31 and the main transmission unit 17 in the coupling zone 18, in the embodiment of the auxiliary transmission 31 shown in Fig. 2 the universal

joint 24 arranged on the end of the cardan shaft 23 facing towards the second drive output shaft 6 is integrated in the first gear wheel 20. This increases the distance between the two link points of the two universal joints of the cardan shaft 23, so that the deflection angle of the cardan shaft is reduced. This measure allows larger offsets to be accommodated between the auxiliary transmission 31 or its second drive output shaft 6 and the drive shaft of the drive wheels, than with the embodiment of the auxiliary transmission 31 shown in Fig. 1.

1-7. (CANCELED)

8. (CURRENTLY AMENDED) An auxiliary transmission (31) with a controllable clutch (2) for optional distribution of a drive output torque from a main transmission unit to one or more drive output shafts (5, 6), the auxiliary transmission comprising:

an auxiliary transmission housing having a first end face (42) ~~having a connection~~ connected with a corresponding end face (40) of a main transmission unit housing in a coupling zone (18) defining a plane, and the plane defined by [[with]] the coupling zone (18) being generally coplanar with ~~the connection between~~ the end faces (42, 40) of the auxiliary transmission housing and the main transmission unit housing; and

an electric motor (8) for controlling the clutch (2);

wherein the electric motor (8) is arranged and at least partially lies in the plane defined by [[in]] the coupling zone (18) of the auxiliary transmission (31) [[to]] with the main transmission unit (17).

9. (CURRENTLY AMENDED) The auxiliary transmission according to claim 8, wherein the electric motor (8) projects outward from the end face (40) of the main transmission housing and in a direction [[of]] toward the auxiliary transmission (31) in an area of the main transmission unit (17) which faces the auxiliary transmission (31) and is located in the coupling zone and radially offset from the connection between the end faces of the auxiliary transmission housing and the main transmission unit housing.

10. (CURRENTLY AMENDED) The auxiliary transmission according to claim 8, wherein the electric motor (8) is arranged outside a housing (19) of the main transmission unit (17) and is connected to at least one ~~or more~~ of a housing of the auxiliary transmission (1) and to the housing (19) of the main transmission unit (17).

11. (CANCELED)

12. (PREVIOUSLY PRESENTED) The auxiliary transmission according to claim 8, wherein a hydraulic pump (14) is arranged outside a mounting (15, 16) of the auxiliary transmission (1) and between the mounting (15, 16) and the coupling zone.

13. (CURRENTLY AMENDED) The auxiliary transmission according to claim 8, wherein a reduction gear stage (3) ~~is provided, which~~ is connected in series after the clutch (2).

14. (PREVIOUSLY PRESENTED) The auxiliary transmission according to claim 13, wherein the reduction gear stage (3) can be controlled by the electric motor (8).

15. (CURRENTLY AMENDED) An auxiliary transmission (31) with a controllable clutch (2) for optional distribution of a drive output torque from a main transmission to one or more drive output shafts (5, 6), the auxiliary transmission comprising:

an auxiliary transmission housing having a first end face (40) with a corresponding end face (42) of a main transmission housing being connected with one another along a coupling zone (18) defining a plane; and

an electric motor (8) for controlling operation of the clutch (2) of the auxiliary transmission (31);

wherein the electric motor (8) is connected with the main transmission housing and at least partially lies within [[a]] the plane defined by the coupling zone (18), and the electric motor (8), during operation of the, controls operation of the clutch (2) of the auxiliary transmission (31).

16. (CURRENTLY AMENDED) An auxiliary transmission (31) with a controllable clutch (2) for optional distribution of a drive output torque from a main transmission to one or more drive output shafts (5, 6), the auxiliary transmission comprising:

an auxiliary transmission housing having a first end face (40) with a corresponding end face (42) of a main transmission unit housing being connected with one another along a coupling zone (18) defining a longitudinal plane which is coincident with the first and the corresponding end faces (40, 42); and

an electric motor (8) for controlling operation of the clutch (2);

wherein the electric motor (8) is directly mounted to the first end face (40) of the main transmission housing and at least partially lies within [[a]] the longitudinal plane defined by the coupling zone (18).